



**TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

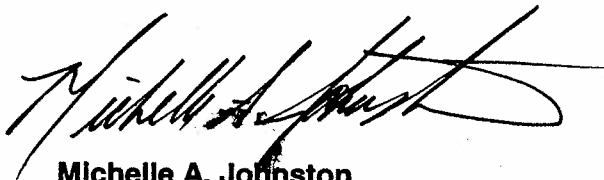
**ANALYTICAL REPORT**

**Perfluorocarbon (PFC) Analysis**

**Lot #: D9L080425**

**Dena Haverland**

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**January 15, 2010**

## **Case Narrative**

### **D9L080425**

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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#### **Sample Arrival and Receipt**

The following report contains the analytical results for four samples received at TestAmerica Denver on December 4, 2009, according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 2.1°C.

The sample collection times were listed as 12-12 on the chain-of-custody, which means the samples were collected over 24 hours. Due to a limitation in the LIM system, the times had to be entered as 12:01 AM.

No other anomalies were encountered during sample receipt.

#### **Standards**

Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDaA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

#### **Sample Extraction and Analysis**

The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

#### **Method QC Samples**

The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments.

### **Analytical Comments**

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to matrix interferences, all four samples had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required. Please note samples STP3 INF and STP4 INF were black in color and samples STP3 EFF and STP4 EFF were dark orange in color.

Please note the laboratory had to use two cartridges to extract all four samples for FOSA.

Due to low percent recoveries in the low-level LCS associated with batch 9342427, all four samples were re-extracted out of the laboratory prescribed hold time and reanalyzed. Both batches have been included in this report. There is no prescribed regulatory holding time requirement for PFCs. The scientific literature indicates PFCs are highly persistent compounds in the environment. TestAmerica Denver has conducted stability studies indicating medium- and low-level standard solutions of PFOA are stable for at least three months in glass, polystyrene, and polypropylene plastics at  $4 \pm 2$  °C. The 7-day/40-day and 14-day/40-day holding times listed above are based on the general EPA convention for the holding time of extractable organic compounds in water and soil. Please note the sample results should be considered estimated.

Due to a limitation in the LIMS system, the low-level LCS associated with QC batch 0005270 reported the percent recoveries for several PFCs as 0.0%. These compounds were recovered within the control limits, as outlined below.

Compound	Low-Level LCS Actual Recovery	Control Limits	Low-Level LCS Actual Result	MDL
PFDA	46%	60-154%	0.00921 ug/kg	0.755 ug/kg
PFTrIA	27%	44-164%	0.00544 ug/kg	1.15 ug/kg
PFTeA	44%	47-172%	0.00875 ug/kg	1.45 ug/kg

As the compounds were detected below the Method Detection Limits (MDL), the system reports the percent recoveries as 0.0%.

The low-level LCS associated with QC batch 9342427 exhibited percent recoveries and internal standard recoveries below the QC control limits for several compounds. Upon re-extraction and reanalysis in QC batch 0005270; the percent recovery outliers were still present, demonstrating this anomaly is most likely due to matrix interference. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The method required MS/MSD could not be performed for QC batches 9342427, 9342428, and 0005270, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable low-level LCS and mid-level LCS/LCSD analyses data.

The Standard Operating Procedure (SOP) was altered slightly for these samples in the sample prep and LC conditions. The alterations are listed below.

Solvents are now the same as they were in the original SOP and run per the following gradient: From 0 to 11 minutes, the flow rate is 0.4 mL/minute and the MeOH ramps up from 25% to 100%. From 11 to 11.01 minutes, the flow rate increases to 0.7 mL/minute and this flow is

Lot #: D9L080425

diverted from the MS. At 13 minutes the flow rate decreases back down to 0.4 mL/minute and 25% MeOH. The column then equilibrates to 14 minutes.

PFTriA and PFTeA now use  $^{13}\text{C}_2$  PFUnA as their internal standard instead of  $^{13}\text{C}_2$  PFDoA.

No other anomalies were observed.

## EXECUTIVE SUMMARY - Detection Highlights

D9L080425

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
STP3 INF 12/02/09 00:01 001				
Perfluorohexanoic acid (PFHxA)	0.074 J	0.40	ug/L	DEN -LC-0012
STP3 EFF 12/02/09 00:01 002				
Perfluorohexanoic acid (PFHxA)	0.36 J	1.0	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	1.1	1.0	ug/L	DEN -LC-0012
Perfluoropentanoic acid (PFPA)	0.54 J	0.60	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	0.23 J	0.40	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	1.5	0.40	ug/L	DEN -LC-0012
STP4 INF 12/02/09 00:01 003				
Perfluorobutane sulfonate (PFB)	1.8 J	2.0	ug/L	DEN -LC-0012
Perfluorooctanoic Acid	0.22 J	0.40	ug/L	DEN -LC-0012
Perfluoropentanoic acid (PFPA)	0.53 J	0.60	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	0.26 J	0.40	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	2.6	0.40	ug/L	DEN -LC-0012
STP4 EFF 12/02/09 00:01 004				
Perfluoropentanoic acid (PFPA)	0.90 J	1.5	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	0.46 J	1.0	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	3.0	1.0	ug/L	DEN -LC-0012
Perfluorobutanoic acid (PFBA)	0.37 J	0.40	ug/L	DEN -LC-0012
Perfluoropentanoic acid (PFPA)	1.0	0.60	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	0.40	0.40	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	4.4	0.40	ug/L	DEN -LC-0012

## METHODS SUMMARY

D9L080425

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
LC/MS/MS PFCs	DEN -LC-0012	SW846 FOSA spec

### References:

DEN     Severn Trent Laboratores, Denver, Facility Standard  
         Operating Procedure.

## METHOD / ANALYST SUMMARY

D9L080425

<u>ANALYTICAL METHOD</u>	<u>ANALYST</u>	<u>ANALYST ID</u>
DEN -LC-0012	Jacqueline Bonnett	003601
DEN -LC-0012	Teresa L. Williams	002510

### References:

DEN      Severn Trent Laboratores, Denver, Facility Standard  
Operating Procedure.

## SAMPLE SUMMARY

D9L080425

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
LQNLF	001	STP3 INF	12/02/09	00:01
LQNLM	002	STP3 EFF	12/02/09	00:01
LQNLQ	003	STP4 INF	12/02/09	00:01
LQNLR	004	STP4 EFF	12/02/09	00:01

### NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.



**Dalton Utilities**

**Client Sample ID: STP3 INF**

**HPLC**

**Lot-Sample #....:** D9L080425-001    **Work Order #....:** LQNLFI1AA    **Matrix.....:** WATER  
**Date Sampled....:** 12/02/09 00:01    **Date Received...:** 12/04/09  
**Prep Date.....:** 12/08/09    **Analysis Date...:** 12/29/09  
**Prep Batch #....:** 9342427    **Analysis Time...:** 08:47  
**Dilution Factor:** 100  
**Method.....:** DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	2.0	ug/L	0.98
Perfluorooctanesulfonate	ND	2.0	ug/L	1.3
Perfluorobutanoic acid (PFBA)	ND	2.0	ug/L	0.98
Perfluoropentanoic acid (PFPA)	ND	3.0	ug/L	1.1
Perfluorohexanoic acid (PFHxA)	ND	2.0	ug/L	0.29
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ug/L	1.3
Perfluorononanoic acid (PFNA)	ND	2.0	ug/L	1.7
Perfluorodecanoic acid (PFDA)	ND	2.0	ug/L	0.78
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ug/L	0.69
Perfluorododecanoic acid (PFDoA)	ND	2.0	ug/L	1.5
Perfluorotridecanoic acid (PFTriA)	ND	2.0	ug/L	1.8
Perfluorotetradecanoic acid (PFTeA)	ND	2.0	ug/L	1.5
Perfluorobutane sulfonate (PFBS)	ND	2.0	ug/L	0.82
Perfluorohexane sulfonate (PFHxS)	ND	3.0	ug/L	0.70

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	99	(60 - 155)
13C4 PFOS	112	(45 - 130)
13C4 PFBA	105	(36 - 130)
13C2 PFHxA	95	(55 - 135)
18O2 PFHxS	107	(61 - 130)
13C5 PFNA	117	(54 - 132)
13C2 PFDA	107	(53 - 130)
13C2 PFUnA	110	(37 - 130)
13C2 PFDoA	115	(26 - 130)

Dalton Utilities

Client Sample ID: STP3 INF

HPLC

Lot-Sample #....: D9L080425-001    Work Order #....: LQNLFIAC    Matrix.....: WATER  
Date Sampled....: 12/02/09 00:01    Date Received...: 12/04/09  
Prep Date.....: 12/08/09    Analysis Date...: 12/30/09  
Prep Batch #....: 9342428    Analysis Time...: 16:52  
Dilution Factor: 100  
Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	5.0	ug/L	0.57

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
MeFOSA	77	(37 - 130)

**Dalton Utilities**

**Client Sample ID: STP3 INF**

**HPLC**

**Lot-Sample #....:** D9L080425-001    **Work Order #....:** LQNL2AA    **Matrix.....:** WATER  
**Date Sampled....:** 12/02/09 00:01    **Date Received...:** 12/04/09  
**Prep Date.....:** 01/05/10    **Analysis Date...:** 01/08/10  
**Prep Batch #....:** 0005270    **Analysis Time...:** 23:11  
**Dilution Factor:** 20  
**Method.....:** DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	0.40	ug/L	0.20
Perfluorooctanesulfonate	ND	0.40	ug/L	0.27
Perfluorobutanoic acid (PFBA)	ND	0.40	ug/L	0.20
Perfluoropentanoic acid (PFPA)	ND	0.60	ug/L	0.22
Perfluorohexanoic acid (PFHxA)	0.074 J	0.40	ug/L	0.058
Perfluoroheptanoic acid (PFHpA)	ND	0.40	ug/L	0.26
Perfluorononanoic acid (PFNA)	ND	0.40	ug/L	0.35
Perfluorodecanoic acid (PFDA)	ND	0.40	ug/L	0.16
Perfluoroundecanoic acid (PFUnA)	ND	0.40	ug/L	0.14
Perfluorododecanoic acid (PFDoA)	ND	0.40	ug/L	0.30
Perfluorotridecanoic acid (PFTriA)	ND	0.40	ug/L	0.35
Perfluorotetradecanoic acid (PFTeA)	ND	0.40	ug/L	0.29
Perfluorobutane sulfonate (PFBS)	ND	0.40	ug/L	0.16
Perfluorohexane sulfonate (PFHxS)	ND	0.60	ug/L	0.14

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	104	(60 - 155)
13C4 PFOS	90	(45 - 130)
13C4 PFBA	100	(36 - 130)
13C2 PFHxA	92	(55 - 135)
18O2 PFHxS	91	(61 - 130)
13C5 PFNA	102	(54 - 132)
13C2 PFDA	104	(53 - 130)
13C2 PFUnA	108	(37 - 130)
13C2 PFDoA	121	(26 - 130)

**NOTE(S) :**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: STP3 EFF

HPLC

Lot-Sample #....: D9L080425-002    Work Order #....: LQNLML1AA    Matrix.....: WATER  
 Date Sampled....: 12/02/09 00:01    Date Received...: 12/04/09  
 Prep Date.....: 12/08/09    Analysis Date...: 12/29/09  
 Prep Batch #....: 9342427    Analysis Time...: 09:02  
 Dilution Factor: 50

Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	1.0	ug/L	0.49
Perfluorooctanesulfonate	ND	1.0	ug/L	0.67
Perfluorobutanoic acid (PFBA)	ND	1.0	ug/L	0.49
Perfluoropentanoic acid (PFPA)	ND	1.5	ug/L	0.55
Perfluorohexanoic acid (PFHxA)	0.36 J	1.0	ug/L	0.15
Perfluoroheptanoic acid (PFHpA)	ND	1.0	ug/L	0.66
)				
Perfluorononanoic acid (PFNA)	ND	1.0	ug/L	0.87
Perfluorodecanoic acid (PFDA)	ND	1.0	ug/L	0.39
Perfluoroundecanoic acid (PFUnA)	ND	1.0	ug/L	0.34
A)				
Perfluorododecanoic acid (PFDoA)	ND	1.0	ug/L	0.75
A)				
Perfluorotridecanoic acid (PFTriA)	ND	1.0	ug/L	0.89
Perfluorotetradecanoic acid (PFTeA)	ND	1.0	ug/L	0.73
Perfluorobutane sulfonate (PFBS)	1.1	1.0	ug/L	0.41
Perfluorohexane sulfonate (PFHxS)	ND	1.5	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	114	(60 - 155)
13C4 PFOS	112	(45 - 130)
13C4 PFBA	104	(36 - 130)
13C2 PFHxA	100	(55 - 135)
18O2 PFHxS	101	(61 - 130)
13C5 PFNA	112	(54 - 132)
13C2 PFDA	101	(53 - 130)
13C2 PFUnA	103	(37 - 130)
13C2 PFDoA	97	(26 - 130)

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: STP3 EFF

HPLC

Lot-Sample #....: D9L080425-002 Work Order #....: LQNLMIAC Matrix.....: WATER  
 Date Sampled....: 12/02/09 00:01 Date Received...: 12/04/09  
 Prep Date.....: 12/08/09 Analysis Date...: 12/30/09  
 Prep Batch #....: 9342428 Analysis Time...: 16:57  
 Dilution Factor: 50  
 Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	2.5	ug/L	0.29

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
MeFOSA	80	(37 - 130)

**Dalton Utilities**

**Client Sample ID: STP3 EFF**

**HPLC**

Lot-Sample #....: D9L080425-002    Work Order #....: LQNL2AA    Matrix.....: WATER  
 Date Sampled....: 12/02/09 00:01    Date Received...: 12/04/09  
 Prep Date.....: 01/05/10    Analysis Date...: 01/08/10  
 Prep Batch #....: 0005270    Analysis Time...: 23:26  
 Dilution Factor: 20

**Method.....: DEN -LC-0012**

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	0.40	ug/L	0.20
Perfluorooctanesulfonate	ND	0.40	ug/L	0.27
Perfluorobutanoic acid (PFBA)	ND	0.40	ug/L	0.20
Perfluoropentanoic acid (PFPA)	0.54 J	0.60	ug/L	0.22
Perfluorohexanoic acid (PFHxA)	0.23 J	0.40	ug/L	0.058
Perfluoroheptanoic acid (PFHpA)	ND	0.40	ug/L	0.26
)				
Perfluorononanoic acid (PFNA)	ND	0.40	ug/L	0.35
Perfluorodecanoic acid (PFDA)	ND	0.40	ug/L	0.16
Perfluoroundecanoic acid (PFUnA)	ND	0.40	ug/L	0.14
A)				
Perfluorododecanoic acid (PFDoA)	ND	0.40	ug/L	0.30
A)				
Perfluorotridecanoic acid (PFTriA)	ND	0.40	ug/L	0.35
Perfluorotetradecanoic acid (PFTeA)	ND	0.40	ug/L	0.29
Perfluorobutane sulfonate (PFBS)	1.5	0.40	ug/L	0.16
Perfluorohexane sulfonate (PFHxS)	ND	0.60	ug/L	0.14

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	105	(60 - 155)
13C4 PFOS	87	(45 - 130)
13C4 PFBA	99	(36 - 130)
13C2 PFHxA	93	(55 - 135)
18O2 PFHxS	92	(61 - 130)
13C5 PFNA	97	(54 - 132)
13C2 PFDA	95	(53 - 130)
13C2 PFUnA	106	(37 - 130)
13C2 PFDoA	97	(26 - 130)

**NOTE(S) :**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: STP4 INF**

**HPLC**

**Lot-Sample #....:** D9L080425-003    **Work Order #....:** LQNLQ1AA    **Matrix.....:** WATER  
**Date Sampled....:** 12/02/09 00:01    **Date Received...:** 12/04/09  
**Prep Date.....:** 12/08/09    **Analysis Date...:** 12/29/09  
**Prep Batch #....:** 9342427    **Analysis Time...:** 09:17  
**Dilution Factor:** 100  
**Method.....:** DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	2.0	ug/L	0.98
Perfluorooctanesulfonate	ND	2.0	ug/L	1.3
Perfluorobutanoic acid (PFBA)	ND	2.0	ug/L	0.98
Perfluoropentanoic acid (PFPA)	ND	3.0	ug/L	1.1
Perfluorohexanoic acid (PFHxA)	ND	2.0	ug/L	0.29
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ug/L	1.3
Perfluorononanoic acid (PFNA)	ND	2.0	ug/L	1.7
Perfluorodecanoic acid (PFDA)	ND	2.0	ug/L	0.78
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ug/L	0.69
Perfluorododecanoic acid (PFDoA)	ND	2.0	ug/L	1.5
Perfluorotridecanoic acid (PFTriA)	ND	2.0	ug/L	1.8
Perfluorotetradecanoic acid (PFTeA)	ND	2.0	ug/L	1.5
Perfluorobutane sulfonate (PFBS)	1.8 J	2.0	ug/L	0.82
Perfluorohexane sulfonate (PFHxS)	ND	3.0	ug/L	0.70

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	114	(60 - 155)
13C4 PFOS	111	(45 - 130)
13C4 PFBA	100	(36 - 130)
13C2 PFHxA	98	(55 - 135)
18O2 PFHxS	100	(61 - 130)
13C5 PFNA	109	(54 - 132)
13C2 PFDA	106	(53 - 130)
13C2 PFUnA	112	(37 - 130)
13C2 PFDoA	109	(26 - 130)

**NOTE(S) :**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: STP4 INF

HPLC

Lot-Sample #....: D9L080425-003    Work Order #....: LQNLQ1AC    Matrix.....: WATER  
Date Sampled...: 12/02/09 00:01    Date Received...: 12/04/09  
Prep Date.....: 12/08/09    Analysis Date...: 12/30/09  
Prep Batch #....: 9342428    Analysis Time...: 17:02  
Dilution Factor: 132  
Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	6.6	ug/L	0.75

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
MeFOSA	103	(37 - 130)



**Dalton Utilities**

**Client Sample ID: STP4 INF**

**HPLC**

**Lot-Sample #....:** D9L080425-003    **Work Order #....:** LQNLQ2AA    **Matrix.....:** WATER  
**Date Sampled....:** 12/02/09 00:01    **Date Received...:** 12/04/09  
**Prep Date.....:** 01/05/10    **Analysis Date...:** 01/08/10  
**Prep Batch #....:** 0005270    **Analysis Time...:** 23:41  
**Dilution Factor:** 20  
**Method.....:** DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	0.22 J	0.40	ug/L	0.20
Perfluorooctanesulfonate	ND	0.40	ug/L	0.27
Perfluorobutanoic acid (PFBA)	ND	0.40	ug/L	0.20
Perfluoropentanoic acid (PFPA)	0.53 J	0.60	ug/L	0.22
Perfluorohexanoic acid (PFHxA)	0.26 J	0.40	ug/L	0.058
Perfluoroheptanoic acid (PFHpA)	ND	0.40	ug/L	0.26
)				
Perfluorononanoic acid (PFNA)	ND	0.40	ug/L	0.35
Perfluorodecanoic acid (PFDA)	ND	0.40	ug/L	0.16
Perfluoroundecanoic acid (PFUnA)	ND	0.40	ug/L	0.14
A)				
Perfluorododecanoic acid (PFDoA)	ND	0.40	ug/L	0.30
A)				
Perfluorotridecanoic acid (PFTriA)	ND	0.40	ug/L	0.35
Perfluorotetradecanoic acid (PFTeA)	ND	0.40	ug/L	0.29
Perfluorobutane sulfonate (PFBS)	2.6	0.40	ug/L	0.16
Perfluorohexane sulfonate (PFHxS)	ND	0.60	ug/L	0.14

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	107	(60 - 155)
13C4 PFOS	94	(45 - 130)
13C4 PFBA	98	(36 - 130)
13C2 PFHxA	94	(55 - 135)
18O2 PFHxS	96	(61 - 130)
13C5 PFNA	102	(54 - 132)
13C2 PFDA	100	(53 - 130)
13C2 PFUnA	101	(37 - 130)
13C2 PFDoA	122	(26 - 130)

**NOTE(S) :**

J: Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: STP4 EFF**

**HPLC**

**Lot-Sample #....:** D9L080425-004    **Work Order #....:** LQNLRL1AA    **Matrix.....:** WATER  
**Date Sampled....:** 12/02/09 00:01    **Date Received...:** 12/04/09  
**Prep Date.....:** 12/08/09    **Analysis Date...:** 12/29/09  
**Prep Batch #....:** 9342427    **Analysis Time...:** 09:32  
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	1.0	ug/L	0.49
Perfluorooctanesulfonate	ND	1.0	ug/L	0.67
Perfluorobutanoic acid (PFBA)	ND	1.0	ug/L	0.49
Perfluoropentanoic acid (PFPA)	0.90 J	1.5	ug/L	0.55
Perfluorohexanoic acid (PFHxA)	0.46 J	1.0	ug/L	0.15
Perfluoroheptanoic acid (PFHpA)	ND	1.0	ug/L	0.66
)				
Perfluorononanoic acid (PFNA)	ND	1.0	ug/L	0.87
Perfluorodecanoic acid (PFDA)	ND	1.0	ug/L	0.39
Perfluoroundecanoic acid (PFUnA)	ND	1.0	ug/L	0.34
)				
Perfluorododecanoic acid (PFDoA)	ND	1.0	ug/L	0.75
)				
Perfluorotridecanoic acid (PFTriA)	ND	1.0	ug/L	0.89
Perfluorotetradecanoic acid (PFTeA)	ND	1.0	ug/L	0.73
Perfluorobutane sulfonate (PFBS)	3.0	1.0	ug/L	0.41
Perfluorohexane sulfonate (PFHxS)	ND	1.5	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	102	(60 - 155)
13C4 PFOS	110	(45 - 130)
13C4 PFBA	104	(36 - 130)
13C2 PFHxA	102	(55 - 135)
18O2 PFHxS	99	(61 - 130)
13C5 PFNA	112	(54 - 132)
13C2 PFDA	105	(53 - 130)
13C2 PFUnA	107	(37 - 130)
13C2 PFDoA	100	(26 - 130)

**NOTE(S) :**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: STP4 EFF

HPLC

Lot-Sample #....: D9L080425-004    Work Order #....: LQNLRLAC    Matrix.....: WATER  
 Date Sampled....: 12/02/09 00:01    Date Received...: 12/04/09  
 Prep Date.....: 12/08/09    Analysis Date...: 12/30/09  
 Prep Batch #....: 9342428    Analysis Time...: 17:07  
 Dilution Factor: 50  
 Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	2.5	ug/L	0.29

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
MeFOSA	83	(37 - 130)

Dalton Utilities

Client Sample ID: STP4 EFF

HPLC

Lot-Sample #....: D9L080425-004 Work Order #....: LQNL2AA Matrix.....: WATER  
 Date Sampled....: 12/02/09 00:01 Date Received...: 12/04/09  
 Prep Date.....: 01/05/10 Analysis Date...: 01/08/10  
 Prep Batch #....: 0005270 Analysis Time...: 23:56  
 Dilution Factor: 20

Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	0.40	ug/L	0.20
Perfluorooctanesulfonate	ND	0.40	ug/L	0.27
Perfluorobutanoic acid (PFBA)	0.37 J	0.40	ug/L	0.20
Perfluoropentanoic acid (PFPA)	1.0	0.60	ug/L	0.22
Perfluorohexanoic acid (PFHxA)	0.40	0.40	ug/L	0.058
Perfluoroheptanoic acid (PFHpA)	ND	0.40	ug/L	0.26
)				
Perfluorononanoic acid (PFNA)	ND	0.40	ug/L	0.35
Perfluorodecanoic acid (PFDA)	ND	0.40	ug/L	0.16
Perfluoroundecanoic acid (PFUnA)	ND	0.40	ug/L	0.14
A)				
Perfluorododecanoic acid (PFDoA)	ND	0.40	ug/L	0.30
A)				
Perfluorotridecanoic acid (PFTriA)	ND	0.40	ug/L	0.35
riA)				
Perfluorotetradecanoic acid (PFTeA)	ND	0.40	ug/L	0.29
FTeA)				
Perfluorobutane sulfonate (PFBS)	4.4	0.40	ug/L	0.16
S)				
Perfluorohexane sulfonate (PFHxS)	ND	0.60	ug/L	0.14
xS)				

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	129	(60 - 155)
13C4 PFOS	109	(45 - 130)
13C4 PFBA	117	(36 - 130)
13C2 PFHxA	110	(55 - 135)
18O2 PFHxS	109	(61 - 130)
13C5 PFNA	115	(54 - 132)
13C2 PFDA	114	(53 - 130)
13C2 PFUnA	124	(37 - 130)
13C2 PFDoA	125	(26 - 130)

NOTE (S) :

J Estimated result. Result is less than RL.